**Week 3 assignment**

**Before class on Friday, Sept. 11:**

* Read the following article, available from the UT Library Catalog, and listen to the associated soundfiles:

Roach, Peter (2004). British English: Received Pronunciation. *Journal of the International Phonetic Association* 34.2. 239-245.

(On the UT Library website, select *Journal* and type in *Journal of the International Phonetic Association*.

Select *On-line* > *Cambridge University Press Journals Complete*.

Select *2000’s > 2004 – Volume 34 > Issue 2*.

The article is the second to last item in that issue. Download the *PDF* and the *Supplementary Materials* (the soundfiles).)

* Download R. This is free statistical software.

# The site for *The R Project for Statistical Computing*: [http://www.R-project.org/index.html](http://www.r-project.org/index.html). There is also a link on the *Relevant Links* page of the course website. Go to *Download > CRAN* (Comprehensive R Archive Network), and pick a North American site, e.g. https://ftp.osuosl.org/pub/cran/. Click on the *.pkg* icon to open the Installer, and follow the steps to install the package.

* Download RStudio. This is a useful free interface for R.

Go to <https://www.rstudio.com>. Download the Open Source Desktop version of the program for your operating system (Windows, Mac, etc.)

* Locate your measurements from Week 2, in the file *results.txt*.

**In class on Friday, Sept. 11: An exercise in graphing**

(1) First we will add rework your dataset *results.txt*: the spreadsheet file you produced for the Week 2 assignment. Open this file in *Excel*, or some other spreadsheet program. Make sure it has the following properties:

* There are exactly 12 items. The first row is column names, so the last row should be row 13.
* You have the following column names, in the following order: interval, vdur, f1\_20, f2\_20, midf1, midf2, f1\_80, f2\_80 (i.e. the test word, the duration of the vowel, F1 at 20% of vowel duration, F2 at 20% of vowel duration, etc.).

(2) Make sure there are no spaces in the column headings. Retype each column heading without any spaces.

(3) Delete the *vdur* column.

(4) Insert a column in between those for *interval* and *f1\_20*. In Excel, you select the *vdur* column, then select *Insert > Column*. In the top cell of the new column, type *time*, and type in *20* in each cell in that column.

(5) Change the name of the *f1\_20* column to *f1*, and change the name of the *f1\_20* column to *f2*.

(6) Copy the columns under *midf1* and *midf2* (the midpoint formant measurements) into the F1 and F2 columns underneath the values for F1 and F2 at the 20% measurement point.

(7) Copy the columns under *f1\_80* and *f2\_80* (the formant measurements at 80% of vowel duration) into the F1 and F2 columns underneath the values for F1 and F2 at vowel midpoint. You now have 36 rows of formant measurements.

(8) In the *interval* column, copy the initial 12 entries into the next 24 rows, so that there are three copies of the same list of words.

(9) In the time column, type in 50 for the 12 entries in rows 14–25 (the midpoint formant rows), and type in 80 in rows 26–37 (the 80% formant rows).

(10) Delete everything that isn’t in the first 4 columns (*interval, time, f1* and *f2*). There should be 36 entries in each of these columns.

(11) Save the revised spreadsheet file as *results1*. In *Excel*, this can be done by selecting *File > Save*.

(12) Open *RStudio* by clicking on its icon.

(13) In the upper righthand box, click on *Import Dataset*. If you have the data in an Excel file, select *From Excel*. Otherwise, select *From Text (Base).* At the bottom, click *Import*.

(14) In the lower righthand box, select Packages ggplot2

. (If that is not among your options, use *Install* (at the top of that window) to get it).

(15) Copy the following text after the prompt (>) in the lower lefthand window, and hit *Return*.

attach (results1)

(16) Copy the following text after the prompt, and hit *Return*.

mid = subset (results1, time =="50")

(17) Copy the following text after the prompt, and hit *Return*.

ggplot (mid, aes (x = f2, y = f1, label = interval)) + geom\_text () + ylim (1000, 300) + xlim (3000,700) + xlab ("F2 (Hz)") + ylab ("F1 (Hz)")+theme\_bw() + ggtitle ("Formant frequencies at vowel midpoint")

(18) The formant plot should appear in the lower righthand window. Save it by selecting in that window *Export > Save as Image*. The image format is *PNG*. The file name is *mid*. The directory should be the folder where you have the materials for this assignment. Click *Save*.

(19) Copy the following text after the prompt in the lower lefthand window, and hit *Return*.

time1 = subset (results1, time !="50")

(20) Copy the following text after the prompt, and hit *Return*.

ggplot (time1, aes (x = f2, y = f1, group = interval, label = interval)) + geom\_path (arrow = arrow (ends = "last", length = unit (0.1, "inches"))) + geom\_text() + ylim (1000, 300) + xlim (3000,700) + xlab ("F2 (Hz)") + ylab ("F1 (Hz)")+theme\_bw() +ggtitle ("Formant trajectories from 20% to 80% of vowel duration")

(21) The formant plot should appear in the lower righthand window. Save it by selecting in that window *Export > Save as Image*. The image format is *PNG*. The file name is *trajectory*. The directory should be the folder where you have the materials for this assignment. Click *Save*.

(22) To quit R, select (at the top of the screen) *File > Quit Session*. Select the option of not saving the session.

**By 6 PM on Friday, Sept. 11, submit the following through Canvas:**

* The two graphs: *mid* and *trajectory.*
* A recording in wav format of the following sentence of you saying the following sentence as it would be produced in RP:

*The North Wind and the Sun were disputing which was the stronger*.

(To record in Praat, select *New > Record Mono Sound > Record*. Read the sentence in RP, then click *Stop* and then *Save to List & Close*. Save the soundfile by selecting the file in Praat Objects, and selecting *Save > Save as WAV file*.)